

E-Portfolio Site:

Home: <https://biswassandip.github.io/efolio/>

Machine Learning:

<https://biswassandip.github.io/efolio/#mlmodule>

Individual Reflection

End of Module (Machine Learning)

For

M. Sc. In Artificial Intelligence
As required by
University of Essex

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The Machine Learning module further elaborated on building the concepts around exploring the data and inferring from them. It helped build a strong base to implement Neural Networks and then handle the samples. This module helped in understanding the concepts behind object recognition and its segregation. Going further in providing an understanding of how machines perceive data and how objects can be classified. It also delves into the deeper side of object detection.

The following vision, stated as my “individual reflection” about the module, is outlined according to Rolfe et al.’s (2001) reflective model.

What?

The journey began by understanding how machines are used everywhere to help, progress or entertain individuals. I started learning about the critical paths involved in ensuring the data is used for decisions and accurate profiling. Read through how the machines can be enhanced to make decisions autonomously (Schwab & Zahid 2020).

Further in the module, I planned out the next steps to explore data sets and understand how they are read and interpreted before applying any data science techniques. This led to better organising to explore Exploratory Data Analysis (EDA) i.e. refine & define the data by adding the cleansing and analysis steps.

The journey was made more challenging by providing knowledge by introducing team assignments. We, as a group, ran through proper meeting setups, note-taking, actions and tasks, followed by reviews. It was an interesting project of doing a business analysis on the “Airbnb” dataset for our defined business case of “competitive prices for Airbnb room listings based on locality”. The preparation involved brushing through EDA libraries used in Python and then setting up Jupyter notebook.

Then added the analysis during the module journey by applying techniques involved for clustering, correlation and regressions to bring out the relationships between concerned variables – here, price vs listings vs locality.

The journey became more interesting with the introduction of Artificial Neural Networks (ANNs), which provided comprehensive knowledge about ANNs and their effectiveness in the industrial revolution. I was able to gain knowledge on the application of ANN techniques by defining & designing the ANN artefacts by understanding the different functions used for ANN.

Convolutional Neural Networks (CNNs) then followed ANN as a bonus to the Neural Networks jigsaw explaining how the machines can visualise, distinguish and detect through feature learning. I explored the intricacies and strengths of python libraries to achieve such features.

Moreover, the knowledge was enhanced with teamwork to prepare an assessment of Neural Networks using the image data from CIFAR-10 hosted in Kaggle. I learnt about data pre-processing, building a model, understanding overfitting and

techniques that can be applied to overfitting. Ex; dropout techniques, model evaluation, early stopping, etc.

This module's journey had been very challenging as I could not participate in some of the seminars due to the timings of the seminars being in the day clashing with peak office hours. I would recommend that seminars planned out-of-office hours would enable a better number of participants.

The seminars were excellent, with lots of collaboration and tutorial involvement. The team was energised and discussed openly. Problems were noted and then resolved with good explanations with real-life examples.

So what?

By following the discussion boards, lecture casts, whitepaper and book reading, I took additional initiatives in exploring techniques and even took a challenging project to build a python-based image classification by gathering an advisory-level project for my friend's company that already reviews and runs image-based AI bots.

This enhanced my knowledge to explore Python and build self-sufficient Jupyter notebooks that can be viewed as a document to understand and as well run codes within.

Explored further datasets, example from imagenet, CIFAR-10, KINETIC-700, etc. to bring expertise in visualising football data using Python libraries.

Now what?

This module has built a strong foundation about Neural Networks and how to approach data – define, refine, analyse and provide informative recommendations based on how the data speaks.

I am challenging myself to explore the CNN by using the datasets from

imagenet,
MS COCO,
CIFAR-10,
MNIST,
KINETIC-700 etc.

and build an end-to-end flow as a reference running on computers by implementing the following:

1. Download datasets
2. Label dataset for the objects in the images or use labelled data set using bounding
3. Box or polygon. Label at least 1 object in the image. You can choose any platform for
4. Data annotation. Plainsight.ai also offers a free annotation tool.
5. Pre-process data – feature engineering, feature selection etc

6. Build/Train a model to detect objects with at least 70% accuracy.
7. Test the model with new data
8. Build a docket container with the trained model and a simple web app which takes an image or video as input and processes the image/video to detect objects. The app should be able to display original videos with detections.
9. Present your approach and demonstration after completion.

The next step for me is to read and build the mentioned application.